

**SURFACE WATER AND GROUNDWATER SPLIT-SAMPLING AND
SAMPLING OVERSIGHT TRIP REPORT
FOR THE MARCH 28 TO MARCH 30, 2006 SAMPLING EVENT
FORMER NEBRASKA ORDNANCE PLANT
MEAD, NEBRASKA**

Submitted to:

U.S. Environmental Protection Agency
Region 7
Superfund Division
Federal Facilities and Special Emphasis Branch
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1.0 Introduction

TechLaw provides technical assistance to the U.S. Environmental Protection Agency (EPA) Region 7, Superfund Division, Federal Facilities and Special Emphasis Branch, under the Regional Oversight Contract (ROC) Number 68-W-01-051. TechLaw was issued Work Assignment Number 07-7R to provide technical oversight support to EPA at the former Nebraska Ordnance Plant (NOP) in Mead, Nebraska.

2.0 Sampling and Analysis Activities

The purpose of TechLaw's sampling and analysis activities was to collect split samples and to observe, document and report on the quarterly ground water and surface water sampling activities conducted by the U.S. Army Corps of Engineers (USACE) at NOP. Ms. Elisa Durum of TechLaw provided field oversight support during the sampling activities. The sampling team consisted of USACE's contractor, Environmental Chemical Corporation (ECC), and ASW, subcontractors to ECC.

TechLaw collected split samples at locations selected by U.S. EPA, from groundwater monitoring wells, a surface water location in Johnson Creek, and effluent from the treated groundwater at both the Main Water Treatment Plant and Load Line 1. During sampling, TechLaw collected one matrix spike/matrix spike duplicate (MS/MSD) sample per twenty samples (per media per analyte) and one field duplicate sample per ten samples (per media per analyte). Samples collected at MW-21A, MW-21B, MW-21D, MW-24A, MW-24B, MW-43A, MW-43B, and MW-43D, the Main Water Treatment Plant and Load Line 1 were analyzed for perchlorates and 1,4-dioxane. Samples collected from MW-31A, MW-31B, MW-32A, MW-32B, MW-32D, MW-33A, MW-33B, MW-33D, MW-34A, MW-34B, MW-42A, MW-42B and MW-42D were analyzed for perchlorates only. Surface water samples collected from Johnson Creek (location SW-08) were analyzed for volatile organic compounds (VOCs) and explosives.

2.1 March 28, 2006

On March 28, 2006 Ms. Durum met with Dave Dander and Mike McGinty, both of ECC, at the hotel at 0700. From the hotel, Ms. Durum followed ECC to the NOP site, and arrived at the Main Water Treatment Plant at 0730. Ms. Durum met with Timothy Thares and Vince Stallbaumer, the two plant managers with ECC. Ms. Durum then attended a health and safety meeting, and proceeded to the MW-24 monitoring well clusters.

At 0810, Ms. Durum arrived at MW-24A, B and D. The wells were located on the side of a busy highway, directly next to agricultural land. Low flow purging was conducted using a continuous low flow peristaltic pump. The tubing used for groundwater collection was decontaminated before each use. The following field parameters were measured and recorded by ASW: flow rate volume; depth to water; pH; temperature; conductivity; turbidity; reduction/oxidation potential, and dissolved oxygen (DO). Standard stabilization criteria were used for monitoring field parameters to determine when the well was ready for sampling. The field parameters measured prior to sampling are provided in Table 1.

At 0830, the ASW sampling team began measuring the field parameters at MW-24A. The well was comprised of a PVC pipe, a concrete pad and a locked casing. At 0855 the field parameters stabilized and the sampling team began to collect USACE samples. The USACE samples were to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split samples, which consisted of three vials with HCL preservative for 1,4-dioxane, and one 1-liter Cubitainer® container for perchlorates. After sample collection, the samples were immediately placed on ice. The sample numbers for the samples collected at MW-24A for perchlorates was 2970-2-24A and for 1,4 Dioxane were 2970-302-24A-1, 2970-302-24A-2 and 2970-302-24A-3.

The sample team collected samples at MW-24B next, which is located by MW-24A. Samples were collected in the same manner as at MW-24A. At 0915, the parameters stabilized and the sampling team began to collect USACE samples. The USACE samples were to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split samples, which consisted of three vials with HCL preservative added by TechLaw for 1,4-dioxane and one 1-liter Cubitainer® container for perchlorates. The sample numbers for samples collected at MW-24B for perchlorates was 2970-1-24B and for 1,4 Dioxane were 2970-301-24B-1, 2970-301-24B-2 and 2970-301-24B-3.

At 10:00, Ms Durum, Mr. Dander and Mr. McGinity drove to the collect the surface water sample at Johnson Creek. Mr. Dander collected TechLaw's surface water sample for explosives directly into two 128-ounce amber glass bottles (Samples 2970-101-JC-1 and 2970-101-JC-MS). In addition, nine surface water samples were collected for the analysis of VOCs in vials preserved with HCL. The nine vials collected included three vials for the field blank and three vials for the matrix spike/matrix spike duplicate. Sample numbers for the VOC samples are: 2970-201-JC-1, 2970-201-JC-2, 2970-201-JC-3, 2970-201-MS (three vials), and 2970-201-FB (three vials).

At 1040, Ms. Durum arrived at MW-21A. At 1100 the parameters stabilized and the sampling team began to collect USACE samples. Samples were collected in the same manner as at MW-24A. The ASW personnel collected TechLaw's split samples, which consisted of nine vials with HCL preservative for 1,4-dioxane and three 1-liter Cubitainer® containers for perchlorates. Field duplicates and matrix spike/matrix spike duplicates were collected for both 1,4-dioxane and perchlorates. Sample identification numbers for the 1,4-dioxane are: 2970-303-21A-1, 2970-303-21A-2, 2970-303-21A-3, 2970-304-21A-MS (three vials) and 2970-314-FB-21A (three vials). Sample numbers for perchlorates are: 2970-3-21A, 2970-4-21A-MS and 2970-5-21A-FB.

After sample collection was completed at MW-21A, the sampling team began to set up at MW-21B. At 1120 the parameters stabilized and the sampling team began to collect USACE samples. Samples were collected in the same manner as at MW-24A. The ASW personnel collected TechLaw's split samples, which consisted of three vials with HCL preservative for 1,4-dioxane and one 1-liter Cubitainer® container for perchlorates. Sample numbers for the 1,4-dioxane are: 2970-305-21B-1, 2970-305-21B-2 and 2970-305-21B-3. The sample number for perchlorates is 2970-6-21B.

After sample collection was completed at MW-21B, the sampling team began to set up at MW-

21D. At 1155 the parameters stabilized and the sampling team began to collect USACE samples. Samples were collected in the same manner as at MW-24A. The ASW personnel collected TechLaw's split samples, which consisted of three vials with HCL preservative for 1,4-dioxane and one 1-liter Cubitainer® container for perchlorates. Sample numbers for the 1,4-dioxane are: 2970-306-21D-1, 2970-306-21D-2 and 2970-306-21D-3. The sample number for perchlorates is 2970-7-21D.

After lunch, the sampling team began to set up at MW-43B. MW-43B was located near the highway and close to an area used for agricultural purposes. At 1440 the parameters stabilized and the sampling team began to collect USACE samples. Samples were collected in the same manner as at MW-24A. The ASW personnel collected TechLaw's split samples, which consisted of three vials with HCL preservative for 1,4-dioxane and one 1-liter Cubitainer® container for perchlorates. Sample numbers for the 1,4-dioxane are: 2970-307-43B-1, 2970-307-43B-2 and 2970-307-43B-3. The sample number for perchlorates is 2970-8-43B.

The sampling team collected samples at MW-43A at 1535 and MW-43D at 1605. The wells were located next to MW-43B. The samples were collected in the same manner as MW-24A. The ASW personnel collected TechLaw's split samples, which consisted of three vials with HCL preservative for 1,4-dioxane and one 1-liter Cubitainer® container for perchlorates. Sample numbers for the MW-43A 1,4-dioxane are: 2970-308-43A-1, 2970-308-43A-2 and 2970-308-43A-3. The sample number for MW-43A perchlorates is 2970-9-43A. Sample numbers for the MW-43D 1,4-dioxane are: 2970-309-43D-1, 2970-309-43D-2 and 2970-309-43D-3. The sample number for MW-43D perchlorates is 2970-10-43D. This was the last group of wells sampled for the day. At 1700 Ms. Durum departed the site.

2.2 *March 29, 2006*

Ms. Durum arrived at the site at 0700 on March 29, 2006. The weather was cloudy and approximately 40°F. After making copies of the field sheets and talking with Mr. Dander, Ms. Durum followed ASW out to the MW-31 cluster (MW-31A, B and D).

The sampling team began to set up at MW-31B. There was a problem purging the well, so a different low flow peristaltic pump was used. The second pump also was not working, so a bladder pump was used instead. At 0910, the parameters stabilized and the sampling team began to collect USACE samples. The USACE collected samples to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split sample, which consisted of one 1-liter Cubitainer® container for perchlorates. After sample collection, the samples were immediately placed on ice. The sample number for the sample collected at MW-31B for perchlorates was 2970-12-31B.

A sample was collected at MW-31A at 1010 using the same method as at MW-31B. The turbidity at MW-31A was continually high, and it took awhile for the field parameters to stabilize. The USACE collected samples to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split sample, which consisted of one 1-liter Cubitainer® container for perchlorates. The sample number for the sample collected at MW-31A for perchlorates was 2970-11-31A.

At 1040, the sampling team arrived at MW-32A, B and D. The monitoring wells were located in the middle of a livestock pasture. The sampling team tried to use the low flow peristaltic pumps, but the pumps were still not working properly. Therefore, bladder pumps were used for MW-32 A, B and D. The sampling team began to sample MW-32A at 1145. Samples were collected in the same manner as at MW-31B. The USACE collected samples to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split sample, which consisted of one 1-liter Cubitainer® container for perchlorates. The sample number for the sample collected at MW-32A for perchlorates was 2970-16-32A.

Samples were collected at MW-32D at 1230 and at MW-32B at 1310. Samples were collected in the same manner as at MW-31B. The USACE collected samples to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split sample, which consisted of one 1-liter Cubitainer® container for perchlorates. The sample number for the sample collected at MW-32B for perchlorates was 2970-20-32B. A field duplicate was also collected at MW-32B and was sample number 2970-20-32B-FB. The sample number for the sample collected at MW-32D for perchlorates was 2970-18-32D.

After lunch, the sampling team began to set up at MW-34A, B and D. The sample team used the bladder pump to collect samples at MW-34A, B and D. Samples were collected at MW-34A at 1405, MW-34B at 1445 and MW-34D at 1525. Samples were collected in the same manner as at MW-31B. The USACE collected samples to be analyzed for VOCs and explosives. The ASW personnel then collected TechLaw's split sample, which consisted of one 1-liter Cubitainer® container for perchlorates. The sample number for the sample collected at MW-34A for perchlorates was 2970-13-34A. The sample number for the sample collected at MW-34B for perchlorates was 2970-14-34B. The sample number for the sample collected at MW-34D for perchlorates was 2970-15-34D.

After samples were collected at MW-34D, Ms. Durum went back to the Main Treatment Plant and began to prepare the samples for shipment. Two coolers were shipped in the evening via FedEx. After custody seals were placed on the coolers, the coolers were placed in ASW's van and then dropped off at FedEx. At 1700 Ms. Durum departed the site.

2.3 *March 30, 2006*

On March 30 there were severe thunderstorms in the Omaha area. At 0800 Ms Durum arrived at the Main Treatment Plant. The sampling team had not arrived yet due to the weather. Ms. Durum was informed that the sampling team was going to wait a couple of hours to see if the thunderstorms in the area would pass.

In the meantime, Ms. Durum proceeded to collect samples from the Main Treatment Plant effluent. At 0930, treated effluent samples from the Main Treatment Plant were collected for TechLaw. Samples were collected for 1,4-dioxane in three HCl-preserved vials and the perchlorates sample was collected in one 1-liter Cubitainer® container. The sample number for the 1,4-dioxane are: 2970-310-TP-1, 2970-310-TP-2 and 2970-310-TP-3. The sample number for the perchlorates sample was 2970-21-TP. In addition, a duplicate sample for 1,4-dioxane

was also collected in three pre-preserved with HCl vials. The sample numbers for the duplicate sample are: 2970-310-TP-FD-1, 2970-310-TP-FD-2 and 2970-310-TP-FD-3. The samples were immediately placed on ice.

At 1015, treated effluent samples from Load Line 1 Plant were collected for TechLaw. Samples were collected for 1,4-dioxane in three pre-preserved with HCl vials, and the perchlorates sample was collected in one 1-liter Cubitainer® container. The sample number for the 1,4-dioxane are: 2970-312-LL1-1, 2970-312-LL1-2 and 2970-312-LL1-3. The sample number for the perchlorates sample was 2970-22-LL1. The samples were immediately placed on ice.

When Ms. Durum returned to the Main Treatment Plant she was informed that the sampling team decided that it would be unsafe to collect additional groundwater samples due to the severe weather that day. Further, it was unclear whether groundwater sampling would take place the following day. Therefore, Ms. Durum departed the site at 1130 and went to FedEx to drop off one cooler of samples for shipment to the EPA laboratory.

3.0 Analytical Results

The TechLaw split samples were analyzed per the following methodologies:

1, 4 – Dioxane – EPA CLP method SOW S0M01.1
Explosives – modified EPA method SW846/8330
Perchlorates – modified EPA method 314.0
VOCs – modified EPA method SW846/8260B

Analytical results of the split samples indicated the presence of 1.6 micrograms per liter ($\mu\text{g/L}$) of hexahydro-1,3,5,-trinitro-1,3,5-triazine (RDX) in Sample 101, from Johnson Creek. Trichloroethene was detected in Sample 201 (from Johnson Creek), at 39 $\mu\text{g/L}$, and at 38 $\mu\text{g/L}$ in Sample 201D, the duplicate sample of Sample 201.

Constituents that were detected are summarized in Table 2. Table 3 presents a broader summary of the analytical results.

A map depicting the split sampling locations is included in Appendix B.

TABLE 1: MEASURED FIELD PARAMETERS

Former Nebraska Ordnance Plant
March 28 through March 30, 2006

Monitoring Well	Flow Rate (mL/min)	Depth to Groundwater (Ft.)	pH	Temperature (C)	Conductivity (TDS)	Turbidity NTUs (TSS)	REDOX/Eh Potential (mV)	Dissolved Oxygen (mg/L)
MW-21A	600	40.11	6.96	11.76	.543	1.47	-49.9	.3
MW-21B	650	40.29	6.70	11.40	.440	.15	68.6	8.9
MW-21D	500	40.26	6.96	11.29	.538	4.41	-35.7	.5
MW-24A	600	44.01	6.92	11.84	.931	.90	-87.1	.7
MW-24B	600	43.82	6.54	11.87	.554	.31	104.7	11.7
MW-31A	500	53.0	6.87	9.70	.480	13.6	120.3	10.2
MW-31B	500	53.15	6.34	10.46	.325	2.21	137.9	15.9
MW-32A	500	53.40	6.86	11.82	.445	20.0	107.8	11.5
MW-32B	500	53.35	6.61	13.48	.406	1.87	116.7	17.5
MW-32D	500	53.35	6.93	13.30	.445	23.3	104.5	9.0
MW-34A	500	64.28	7.48	14.07	.514	3.48	82.6	4.2
MW-34B	500	64.04	6.82	14.75	.381	.97	109.9	16.9
MW-34D	600	64.00	6.92	13.15	.517	.89	64.6	.9
MW-43A	575	47.93	6.93	12.14	.599	1.28	82.6	5.2
MW-43B	600	47.84	6.71	12.05	.482	1.79	88.5	11.2
MW-43D	500	48.28	6.93	12.00	.730	.43	71.3	1.7

TABLE 2: SUMMARY OF DETECTED COM

POUNDS

Former Nebraska Ordnance Plant
March 28 through March 30, 2006

Sample ID Number	101	201	201FD
TechLaw Sample ID	2970-101-JC-1	2970-201-JC-(1,2,3)	2970-201-FB
Matrix	Aqueous (Surface Water)	Aqueous (Surface Water)	Aqueous (Surface Water)
Collection Date	03/28/06	03/28/06	03/28/06
Units	µg/L	µg/L	µg/L
Analytes			
Hexahydro-1,3,5-trinitro-1,3,5-triazine	1.6	-	-
Trichloroethene	-	39	38

Table 3 – SUMMARY OF ANALYTICAL RESULTS		
<u>Groundwater Sampling Data</u>		
EPA Split Sampling; March 28 – 30		
Sample Location	Perchlorate Result (ug/L)	1, 4 – Dioxane Result (ug/L)
MW-21A	2 U	2 UJ
MW-21B	2 U	2 UJ
MW-21D	2 U	2 UJ
MW-24A	2 U	2 UJ
MW-24B	2 U	2 UJ
MW-43A	2 U	2 UJ
MW-43B	2 U	2 UJ
MW-43D	2 U	2 UJ
MW-31A	2 U	N/A
MW-31B	2 U	N/A
MW-32A	2 U	N/A
MW-32B	2 U	N/A
MW-32D	2 U	N/A

MW – Monitoring Well

N/A – Not Analyzed

Table 3 – SUMMARY OF ANALYTICAL RESULTS			
<u>Surface Water Sampling Data</u>			
EPA Split Sampling; March 28 – 30			
Sample Location	RDX Result (ug/L)	TCE Result (ug/L)	Other Constituents*
SW-08	1.6	39	Not Detected

* - Analyzed for VOCs and explosives only

Table 3 – SUMMARY OF ANALYTICAL RESULTS		
<u>Treatment Plant Effluent Sampling Data</u>		
EPA Split Sampling; March 28 – 30		
Sample Location	Perchlorate Result (ug/L)	1, 4 – Dioxane Result (ug/L)
Main Treatment Plant	2 U	2 UJ
Load Line 1 Treatment Plant	2 U	2 UJ

U – The analyte was not detected at or above the stated reporting limit.

UJ – The analyte was not detected at or above the stated reporting limit. The reporting limit is an estimate.

APPENDIX A
ANALYTICAL RESULTS

Table 1A: Analytical Results for Groundwater and Surface Water Split-Samples, Collected at the Former Nebraska Ordnance Plant, Mead, NE, on March 28th through March 30th.

Sample Number	TechLaw Sample ID	Analyte	Units	Final Result	Detection ID	Date	Sampling Time	Location/Description
1	2970-1-24B	Perchlorate	ug/L	2.00	U	03/28/2006	09:30	Monitoring well 24B
2	2970-2-24A	Perchlorate	ug/L	2.00	U	03/28/2006	08:55	Monitoring well 24A
3	2970-5-21A-FB	Perchlorate	ug/L	2.00	U	03/28/2006	11:00	Monitoring well 21A/Field Duplicate of sample 3
3	2970-3-21A	Perchlorate	ug/L	2.00	U	03/28/2006	11:00	Monitoring well 21A
6	2970-6-21B	Perchlorate	ug/L	2.00	U	03/28/2006	11:20	Monitoring well 21B
7	2970-7-21D	Perchlorate	ug/L	2.00	U	03/28/2006	11:55	Monitoring well 21D
8	2970-8-43B	Perchlorate	ug/L	2.00	U	03/28/2006	14:40	Monitoring well 43B (located at intersection of 6th & H)
9	2970-9-43A	Perchlorate	ug/L	2.00	U	03/28/2006	15:35	Monitoring well 43A (6th & H)
10	2970-10-43D	Perchlorate	ug/L	2.00	U	03/28/2006	16:05	Monitoring well 43D
11	2970-11-31A	Perchlorate	ug/L	2.00	U	03/29/2006	10:10	Monitoring well 31A
12	2970-12-31B	Perchlorate	ug/L	2.00	U	03/29/2006	09:10	MW-31B (Middle of agricultural land)
13	2970-13-34A	Perchlorate	ug/L	2.00	U	03/29/2006	14:05	Monitoring well 34A
14	2970-14-34B	Perchlorate	ug/L	2.00	U	03/29/2006	14:45	Monitoring well 34B
15	2970-15-34D	Perchlorate	ug/L	2.00	U	03/29/2006	15:25	Monitoring well 34D
16	2970-16-32A	Perchlorate	ug/L	2.00	U	03/29/2006	11:45	Monitoring well 32A (located in middle of cow pastur
18	2970-18-32D	Perchlorate	ug/L	2.00	U	03/29/2006	12:30	Monitoring well 32D (located in middle of cow pastur
19	2970-20-32B-FB	Perchlorate	ug/L	2.00	U	03/29/2006	13:10	Monitoring well 32B/Field Duplicate of sample 19
19	2970-20-32B	Perchlorate	ug/L	2.00	U	03/29/2006	13:10	Monitoring well 32B (Middle of pasture)
21	2970-21-TP	Perchlorate	ug/L	2.00	U	03/30/2006	09:30	Main water treatment plant sample
22	2970-22-LL1	Perchlorate	ug/L	2.00	U	03/30/2006	10:15	Effluent at Load Line 1
101	2970-101-JC-1	2-Amino-4,6-dinitrotoluene	ug/L	0.49	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	4-Amino-2,6-dinitrotoluene	ug/L	0.48	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	3,5-Dinitroaniline	ug/L	0.65	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	1,3-Dinitrobenzene	ug/L	0.42	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	2,4-Dinitrotoluene	ug/L	0.48	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	2,6-Dinitrotoluene	ug/L	0.53	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	Hexahydro-1,3,5-trinitro-1,3,5-triazine	ug/L	1.6		03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	Nitrobenzene	ug/L	0.26	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	Nitroglycerine	ug/L	0.65	U	03/28/2006	10:20	Johnson Creek

Table 1A: Analytical Results for Groundwater and Surface Water Split-Samples, Collected at the Former Nebraska Ordnance Plant, Mead, NE, on March 28th through March 30th (continued).

Sample Number	TechLaw Sample ID	Analyte	Units	Final Result	Detection ID	Date	Sampling Time	Location/Description
101	2970-101-JC-1	2-Nitrotoluene	ug/L	0.5	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	3-Nitrotoluene	ug/L	0.41	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	4-Nitrotoluene	ug/L	0.52	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	ug/L	0.47	UJ	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	Pentaerythritol tetranitrate	ug/L	1.2	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	1,3,5-Trinitrobenzene	ug/L	0.53	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	2,4,6-Trinitrophenylmethyl nitramine	ug/L	0.48	U	03/28/2006	10:20	Johnson Creek
101	2970-101-JC-1	2,4,6-Trinitrotoluene	ug/L	0.61	U	03/28/2006	10:20	Johnson Creek
201	2970-201-FB	Acetone	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Benzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Bromodichloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Bromoform	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Bromomethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	2-Butanone	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Carbon Disulfide	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Carbon Tetrachloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Chlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Chloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Chloroform	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Chloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Cyclohexane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2-Dibromo-3-Chloropropane	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Dibromochloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2-Dibromoethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,3-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,4-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Dichlorodifluoromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1-Dichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2-Dichloroethane	ug/L	1.0	UJ	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201

Table 1A: Analytical Results for Groundwater and Surface Water Split-Samples, Collected at the Former Nebraska Ordnance Plant, Mead, NE, on March 28th through March 30th (continued).

Sample Number	TechLaw Sample ID	Analyte	Units	Final Result	Detection ID	Date	Sampling Time	Location/Description
201	2970-201-FB	cis-1,2-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	trans-1,2-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2-Dichloropropane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	cis-1,3-Dichloropropene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	trans-1,3-Dichloropropene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Ethyl Benzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	2-Hexanone	ug/L	2.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Isopropylbenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Methyl Acetate	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Methyl tert-butyl ether	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Methylcyclohexane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Methylene Chloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	4-Methyl-2-Pentanone	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Naphthalene	ug/L	2.0	UJ	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Styrene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1,2,2-Tetrachloroethane	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Tetrachloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Toluene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2,3-Trichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,2,4-Trichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1,1-Trichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1,2-Trichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Trichloroethene	ug/L	38	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Trichlorofluoromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	1,1,2-Trichlorotrifluoroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	Vinyl Chloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	m and/or p-Xylene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-FB	o-Xylene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek/Field Duplicate of sample 201
201	2970-201-JC-1	Acetone	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Benzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Bromodichloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Bromoform	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Bromomethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek

Table 1A: Analytical Results for Groundwater and Surface Water Split-Samples, Collected at the Former Nebraska Ordnance Plant, Mead, NE, on March 28th through March 30th (continued).

Sample Number	TechLaw Sample ID	Analyte	Units	Final Result	Detection ID	Date	Sampling Time	Location/Description
201	2970-201-JC-1	2-Butanone	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Carbon Disulfide	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Carbon Tetrachloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Chlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Chloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Chloroform	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Chloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Cyclohexane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2-Dibromo-3-Chloropropane	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Dibromochloromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2-Dibromoethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,3-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,4-Dichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Dichlorodifluoromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,1-Dichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2-Dichloroethane	ug/L	1.0	UJ	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,1-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	cis-1,2-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	trans-1,2-Dichloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2-Dichloropropane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	cis-1,3-Dichloropropene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	trans-1,3-Dichloropropene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Ethyl Benzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	2-Hexanone	ug/L	2.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Isopropylbenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Methyl Acetate	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Methyl tert-butyl ether	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Methylcyclohexane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Methylene Chloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	4-Methyl-2-Pentanone	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Naphthalene	ug/L	2.0	UJ	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Styrene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek

Table 1A: Analytical Results for Groundwater and Surface Water Split-Samples, Collected at the Former Nebraska Ordnance Plant, Mead, NE, on March 28th through March 30th (continued).

Sample Number	TechLaw Sample ID	Analyte	Units	Final Result	Detection ID	Date	Sampling Time	Location/Description
201	2970-201-JC-1	1,1,2,2-Tetrachloroethane	ug/L	5.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Tetrachloroethene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Toluene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2,3-Trichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,2,4-Trichlorobenzene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,1,1-Trichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,1,2-Trichloroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Trichloroethene	ug/L	39	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Trichlorofluoromethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	1,1,2-Trichlorotrifluoroethane	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	Vinyl Chloride	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	m and/or p-Xylene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
201	2970-201-JC-1	o-Xylene	ug/L	1.0	U	03/28/2006	10:20	Johnson Creek
301	2970-301-24B-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	09:30	MW-24B
302	2970-302-24A-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	08:56	MW-24A
303	2970-314-FB-21A	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	11:00	MW-21A/Field Duplicate of sample 303
303	2970-303-21A-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	11:00	MW-21A
305	2970-305-21B-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	11:20	MW-21B
306	2970-306-21D-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	11:55	MW-21D
307	2970-307-43B-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	14:40	MW-43B
308	2970-308-43A-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	15:35	MW-43A
309	2970-309-43D-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/28/2006	16:05	MW-43D
310	2970-310-TP-FD-1	1,4-Dioxane	ug/L	2.0	UJ	03/30/2006	09:30	1,4-Dioxane sample = TP/Field Duplicate of sample 31
310	2970-310-TP-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/30/2006	09:30	1,4-Dioxane sample = TP
312	2970-312-LL-1-(1,2,3)	1,4-Dioxane	ug/L	2.0	UJ	03/30/2006	10:15	1,4-Dioxane sample = LL-1

APPENDIX B
Map of Split Sampling Locations

EPA SPLIT SAMPLE LOCATIONS MARCH 28-30, 2006

EXPLANATION:

- 90 Water Supply Wells Private
- EW-6 Extraction Well Location
- Direct Push Sampling Point
- MUD Wells
- MW-18 Monitoring Well Location
- GCW-1 Groundwater Circulation Well
- SW-01 Surface Water Location
- One Mile Buffer Zone
- General Groundwater Flow Directions
- Approximate Area of Explosives-Contaminated Groundwater (RDX Concentrations Greater than or Equal to the Lifetime Health Advisory of 2 ug/L) as per the 1997 ROD
- Approximate Area of Combined TCE Contaminated Groundwater (TCE Concentrations Greater than or Equal to 5 ug/L) as per the 1997 ROD
- Approximate Area of Explosives- Contaminated Groundwater (RDX Concentrations Greater than or Equal to the Lifetime Health Advisory of 2 ug/L) as per the 1997 ROD to include March 2005 data
- Approximate Area of TCE Contaminated Groundwater (TCE Concentrations Greater than or Equal to 5 ug/L) as per the 1997 ROD to include March 2005 data

EPA SAMPLE LOCATIONS



Environmental Chemical Corporation		Corps of Engineers US Army Engineer District Kansas City, Missouri	
2005 Groundwater Monitoring Program Operable Unit No. 2 Former Nebraska Ordnance Plant-Mead, NE.			
Mead Area Well Network			
Scale:	Sheet Number:		
Date: December 2005			
DWG Number:			

